NUMBER 2 • 1956

Kodak Professional Notes

For Registered Owners of:
Kodak Color, Industrial, and Professional Handbooks

KEYS TO COLOR PRINTING

Part III (Test Printing)

THE SOLUTIONS are mixed, the equipment is set up, and the color-printing session is about to start. Question is, now what?

First, a word of hope: Average color transparencies or negatives usually print very close to a single set of exposure conditions. But with either Kodak Color Print Material, Type R or Type C, it cannot, naturally, be assumed that a perfect print will be produced on the very first attempt. It is, therefore, necessary to consider the first print as a test print. The *final* print, to be acceptable, must have correct density *and* correct color balance. Accordingly, in the test-printing procedure, there are two determinations to be made, namely: (1) the exposure which will result in satisfactory density and (2) the filter combination which will achieve good color balance.*

*For printing Kodak Color Print Material, Type C, with red, green, and blue light, the correct ratio of exposures is necessary to achieve correct color balance.

Exposure Tests for Kodak Color Print Material, Type R

After focusing and composing the selected transparency, and after the recommended filters are in position, the exposure level must be determined. A series of exposures in the ratio of 1-2-4-8 should be made across a single sheet of the printing material in the ordinary test-strip fashion. For example, for an Ektachrome transparency on 620-size film which is to be enlarged to make an 8 by 10-inch print, a range that should encompass the normal exposure time for most enlargers at *f*/4.5 would be 20, 40, 80, and 160 seconds. Obviously, the desired exposure time may fall at an intermediate level, say at 120 seconds, but this can now be estimated easily for subsequent prints.

Because it is unlikely that the color balance will be correct in the first exposure test, an additional test print or prints will be necessary. In the event

that the color balance is quite close (within .2 to .3 density units), the technique of viewing the test print with CC color filters, as discussed in Part I of this series of articles, is useful.

It is just as likely, however, that the color balance will be "out in left field," and a series of exposures with various filter densities is then recommended. It is a real help, of course, that the predominant color is perfectly obvious. If, for example, the test print is decidedly cyan, a new series of exposures should be made with additional red CC Filters (for Color Print Material, Type R). How much red to add is again determined by a test-strip type of exposure series. This series could consist of, arbitrarily, four separate exposures adding (first), 20 red; (second), 40 red; (third), 60 red; and (fourth), 80 red. To retain the normal density level for all four areas, exposure adjustments will be required. (See Part II of this series of articles.) One of the areas in this second test print should be close to normal in both color balance and density. If this is true, a full-size print can be made with reasonable assurance that it will be acceptable. Or, if the best test area is still slightly off-balance, the filter-viewing system can be used to help "zero it in." (See Part I of this series of articles.)

Exposure Tests for Kodak Color Print Material, Type C

The principles of bracketing exposures for density and color balance described above apply also in the printing of Color Print Material, Type C, EXCEPT that it is essential to remember that: Type C prints become *darker* with *more* exposure and *lighter* with *less* exposure, and the rate of change is greater—meaning smaller changes in test exposures. Also, in viewing Type C test prints to judge color balance, one half of the *complementary* viewing-filter color value is used in making succeeding test prints. The addition of a red filter, for example, would make the next print *less* red (more cyan).

Multiple Testing

Suppose that you have several color transparencies (or negatives) to print, all at the same degree of enlargement. We suggest this:

After one selected picture has been "zeroed in" by the above testing procedures, the transparency (or negative) is removed from the enlarger and, along with the other transparencies (or negatives), taped to a sheet of glass in such a way that they will cover one sheet of paper economically. All of these originals are printed by contact, using the enlarger as a light source and not changing in any way the enlarger or filters used. The resulting gang of prints can be compared individually to the one picture previously enlarged. This will help you to judge both exposure level and color balance for each of the additional subjects to be enlarged. The object is to match for density and color balance each of the other pictures with the contact "standard." They will then match the optimum quality of the enlarged version of this same picture.

Incidentally, do not discard your "unfortunate" test prints. If the printing conditions including your judgement of the transparency (or negative) involved are indicated on the back of these prints, they can be used as a valuable guide in building your experience and refining your judgement for easier color printing in the future. Also, when a different paper emulsion is used, the records will furnish the data needed to make the exposure ratio change useful.

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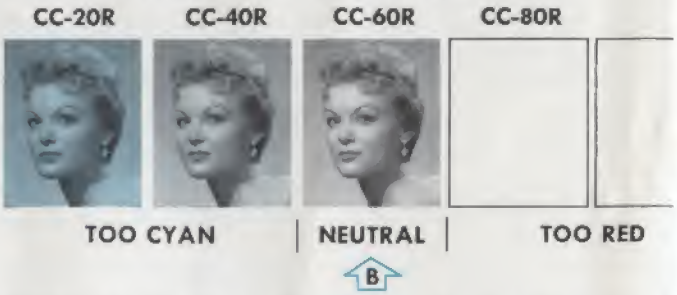
Final thought: You can't make color prints from an armchair!

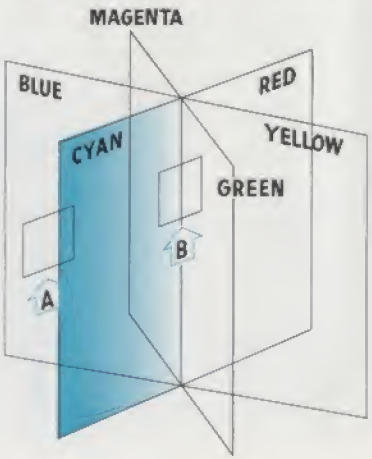
TEST No. 1—DENSITY LEVEL

The diagrams on this page represent the two-step bracketing procedure discussed in the accompanying article. Test No. 1 is made to determine the correct exposure level. Note exposures were .3 (1 stop) density units apart.

TEST No. 2 — COLOR BALANCE



Test No. 2 to establish a satisfactory color balance is illustrated above in the bracketing series made with the Kodak Color Compensating Filters CC-R which were selected, of course, to counteract the initial cyan color present in Test No. 1. In this particular example, a CC-60R Filter (actually a combination of two filters) was found to produce a print with normal balance. The CC-80R Filter gave an excessive degree of correction, so that this area of the test print would be too reddish. An exposure adjustment would be necessary to keep the density at the same desired level in all areas of Test No. 2.



The above test print areas A and B are actually part of a "three-dimensional" color wheel which shows the relationship of density and color balance. Thus, any print position off the vertical density axis would represent a test print out of color balance in the direction indicated.

Understanding

KODAK WIDE FIELD *Ektar Lenses*

Obviously, the answer to how to use any lens successfully lies in recognizing what the lens was designed to do.

Kodak Wide Field Ektar Lenses were designed with two purposes in view: The first was to provide a lens for true wide-angle applications in which a lens with a focal length considerably shorter than normal for a particular film size could be used to cover the field from a restricted camera position. A specific example for use on a 4 x 5 camera is the Kodak Wide Field Ektar Lens, 100mm *f*/6.3. This lens will cover the full 4 x 5-inch negative with a field about 50 percent wider than a normal 6-inch lens.

The second purpose of these lenses was to permit full use of camera swings. Generally, a lens of normal focal length will cover slightly more than the diagonal of the negative. A wide-angle lens with the same focal length will cover a much larger negative. For instance, 135mm Wide Field Ektar Lenses will cover a 5 x 7-inch negative. If this lens is put on a 4 x 5 camera, it means that advantage can be taken of all the camera swings with no loss in definition or illumination at the edges or corners of the picture. It is this application that led us to identify these lenses as "Wide Field" rather than "Wide Angle."

How wide is wide? Generally speaking, a wide-field lens covers an angle of from 55 degrees to 80 degrees, while a true wide-angle lens covers an angle of greater than 80 degrees.

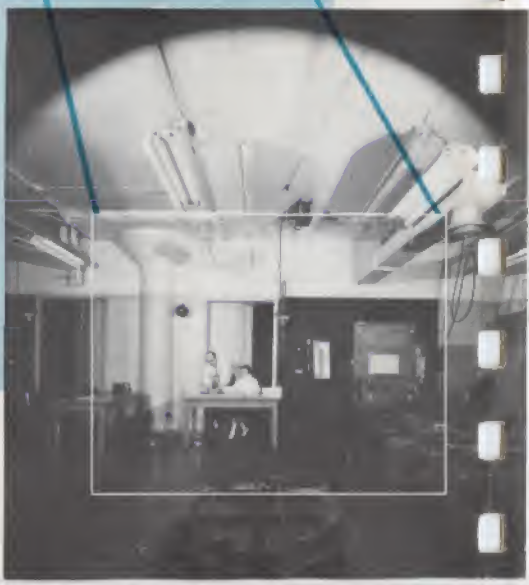
A Wide Field Ektar Lens covers an angle smaller than is usual for wide-*angle* lenses—82° instead of 90°. At the time these lenses were designed, it was realized that they would be used extensively for color photography where corner illumination is critical. An angle greater than 82° would result in a fall-off on corner illumination in excess of the film latitude. While this could be corrected in the studio by lighting the subject appropriately, it would produce objectionable results when used for outdoor work.

Although instructions with the Wide Field Ektar Lenses state that their effectiveness is best realized in commercial applications requiring the full use of camera swings, they can be used as wide-*angle* lenses if the working aperture is smaller than *f*/11. A table showing the proper lens-and-camera combinations to achieve either a wide-angle or wide-field effect is given below.

(COVERAGE AT INFINITY FOCUS)

Focal Length (in mm)	*Wide Angle (w/o swings) (in inches)*	*Wide Field (w/ swings) (in inches)*
80	3¼ x 4¼	2¼ x 3¼
100	4 x 5	3¼ x 4¼
135	5 x 7	4 x 5
190	8 x 10	5 x 7
250	11 x 14	8 x 10

(Continued on page 7)



E-2 Processing Variations

The chart packaged with the Kodak Ektachrome Processing Kit (Process E-2) gives a summary of processing steps and states the correct time and temperature for each solution. These conditions were carefully determined in the Kodak Research Laboratories and should be strictly adhered to if optimum quality is to be obtained. The following data show the adverse effects when deviations from normal recommendations are made.

Effects of Variations in the E-2 Ektachrome Process*

Solution	Standard Time (in minutes)	Effect of Increasing Time from Below Normal to Above Normal	Tolerance
First Developer	10	Increased speed and toe contrast; color balance shifts to magenta-blue.	± 15 seconds critical
Rinse	1	Decreased density throughout scale.	± 20 seconds critical
Hardener	3-10	Shorter time leads to reticulation danger.	
Wash	3		± 1 minute
Color Developer	15	Increased yellow toe stain; color balance shifts slightly to magenta.	± 1 minute
Wash	5	1) Slightly lower minimum density. 2) Mid-scale balance shifts to yellow. 3) More magenta shoulder.	± 1 minute
Clear	5	Increased yellow toe stain; balance shifts to blue.	± 1 minute (Omission of this bath produces a heavy red stain.)
Wash	1	Greater density throughout.	± 30 seconds
Bleach	8	Increased toe stain (shortened time leads to silver retention).	± 2 minutes
Wash	1		± 5 minutes
Fix	3	Reduced density; balance shifts toward cyan.	− 30 seconds + 2 minutes
Wash	8		
Stabilizing Bath	1		(Omission results in rapid fading of some of the dyes.)

*From a paper, "The E-2 Ektachrome Process, Its Variables and Their Control," by Millikan and Groet, presented at the 1955 PSA Convention.

TABLE TOP Process Camera

Your reporter just saw a demonstration of offset plate making via the Verifax Method which is really something!

Here's the story: The original can be any line-copy material—typing, printed matter, drawings, coarse-screened halftones. In the form of charts, cartoons, drawings, sketches, etc., and with or without text, captions, and notations, it can be pasted up in parts on a sheet of paper.

When the preparation of the copy is finished, reproduction quality, exposure, and alignment can be checked with the Verifax Copier in the usual manner by making one or more transfers to paper.

When it is decided that all is in good order, a matrix is exposed in the usual way (by reflex). This time, after the 20-second activation, the matrix is withdrawn from the activator solution through the squeegee blades to remove the liquid from its surface. It is then placed in a Verifax Offset Adapter which is mounted on the front of the table or bench holding the Copier. The matrix is aligned with a Polychrome V-Kote Plate (Polychrome Corporation, 2 Ashburton Avenue, Yonkers 2, New York) previously placed in the Adapter. (Other brands of suitable plates may be available later.) The matrix and plate are withdrawn together under a built-in roller which provides the uniform contact and pressure necessary for a good transfer.

The matrix is then stripped from the Polychrome Plate and the image can be inspected on the plate. Any touching up (removal of unwanted copy, dirty spots, corrections, finger smudges, etc.) can be performed easily with an oil-free rubber eraser. New copy can be added by typewriter or reproducing pencil or pen, if necessary.

Just before the plate is placed on the duplicator or press, it is swabbed with a pad saturated with Polychrome V-Kote Plate Etch. The excess is wiped away, and the plate is placed on the duplicator, ready to run. Total time—about one minute if you haven't used any time making corrections by hand on the plate. The cost of materials—less than 20 cents.

The process offers some additional features: Plates made in this fashion can be stored, either before or after running, for use at a later date. Two plates can be made from one matrix if a long run is planned; if a future rerun is anticipated; or if two duplicators can be used to run the same copy simultaneously to speed up delivery of news releases, price changes, credit data, or catalogue changes, where time is of the essence.

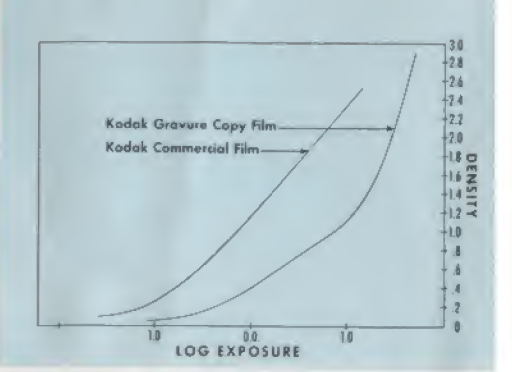
It is even possible to use this system for limited runs (say, 50 to 100 copies) which are required at maximum speed. Thus, instead of abstracting customer orders or specifications for various departments, or routing them chain fashion, make as many duplicates as are required in order to furnish one to each department immediately. No transcription error can creep in. Drawings, handwritten notations, and signatures on the original will all be reproduced faithfully.

The Business Photo Methods Division of the Eastman Kodak Company will be pleased to send you detailed information on the Verifax Method of making offset plates, or you can contact your local Verifax dealer for a demonstration.

Don't let the name—

Kodak Gravure Copy Film

mislead you—



SURE, it's a new film that we think will be of most interest to plants doing photogravure printing. But it's also news for anyone making top-notch copies.

The best way to understand this film's unique characteristics is to look at its unusual curve shape. Shadows and middletone areas are reproduced in the conventional manner, but the contrast, or tonal separation, of the highlight areas gets a sharp—and needed—jolt from the zooming "shoulder" part of the curve. This helps out so much in the reproduction that, when carefully made, *the copy can scarcely be told from the original!* And, if you've ever made copies before, you know that is something!

Negative contrast is controlled only by exposure. Thus, if a negative is underexposed, no improvement in highlight contrast will result; if it is overexposed, the middle tones will be too dark in a reproduction with correct highlight tones. A correctly exposed negative will usually have a maximum density of about 1.7. Don't overlook the suggestions in the film's instruction sheet for familiarizing yourself with this new tool.

UNDERSTANDING EKTARS

(Continued from page 4)

In addition to preserving flatness of field, even at a 1-to-1 magnification, and having no significant shift in focus with change in aperture, these lenses have a built-in bonus: Because of the angle of coverage and almost symmetrical design required to maintain their characteristics, the Wide Field Ektar Lenses are very good for close-up work, for table tops, and for 1-to-1 copying with excellent definition.

For sharpest definition with the Wide Field Ektar Lenses, the lenses should not be used at an aperture larger than *f*/11, depending, of course, upon the amount of camera swing and what is being photographed. In most instances, shooting should be done at an aperture smaller than *f*/11—the maximum aperture of *f*/6.3 is primarily for focusing and composition or when it is not important to have a picture that is sharp to the very edges of the field.

Unlike ordinary lenses, Wide Field Ektar Lenses must be focused on the axis of the lens (where a line through the center of the lens would intersect the ground glass). At full aperture, a zone of lesser definition can be seen slightly off the axis. This cannot be improved by focusing but will become normal upon stopping down the lens.

Of course, wide-angle distortions are not due to any particular lens design. In fact, these perspective distortions would occur even if a pinhole were used to form the image! The remedy for the leaning building lies in the use of camera swings; for the wider-than-normal objects at the edge of the field, an increase in the camera-to-subject distance.

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Baffled by Barn Doors!

Photographs by Rich Warner, Kodak Professional Studio

HERE'S the magic—slender, delicate highlights and edgelights that emphasize the slender, delicate nature of the glassware.

And here's the magician's rolled-up sleeve that shows all.

The "barn doors" were improvised from ordinary 16 by 20-inch white mounting board and simply taped to the diffusing screen of a broad-source portrait light. The width of the longitudinal opening can be varied to control the width of the highlights as desired. The lamp is, of course, positioned so that the glassware "sees" only the illuminated opening and not any of the stray light from the side view as we picture it here.

This particular glassware setup was illuminated with four lights, as shown in the lighting diagram. The background light was an ordinary flood, the front light and the two edge lights were fitted with the cardboard "barn doors."

A bit of advice our photographer has for anyone shooting glassware is to use a studio that can be darkened in order to avoid unwanted reflections.

Sales Service Division
EASTMAN KODAK COMPANY
ROCHESTER 4, N. Y.

KODAK PERIODICAL NO. L7 • 5-56-SH

PRINTED IN THE UNITED STATES OF AMERICA